
STEEL MINE TIMBERS

CARNEGIE STEEL COMPANY

PITTSBURG, PA.



ENTRANCE TO A MODERN MINE, ALLPORT COAL COMPANY, BARNESBORO, PA.

STEEL MINE TIMBERS

TYPES
OF CONSTRUCTION AND
EXAMPLES
OF INSTALLATION



CARNEGIE STEEL COMPANY

PITTSBURG, PA.

1911

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STEEL
MINE
TIMBERS
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ROOF
SUPPORTS

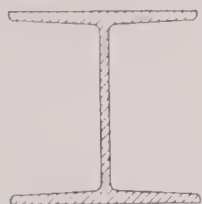


4-INCH H-SECTION ROOF SUPPORTS, ADRIAN MINES, ROCHESTER & PITTSBURG COAL & IRON CO., PUNXSUTAWNEY, PA.

STEEL
MINE
TIMBERS
—
ROOF
SUPPORTS



6-INCH I-BEAM ROOF SUPPORTS, ON BRICK WALLS, LEGGITS CREEK COLLIERY, DELAWARE & HUDSON COMPANY, SCRANTON, PA.



The use of steel roof supports resting on wooden props may be excellent where the strata are approximately level and the loads practically downward. Where, however, the strata are inclined, loads heavy and the sides of the excavation soft, three-piece supports are required and these may be most economically and permanently framed in steel. For the legs of the three-piece gangway support the best form of section is the H-beam, which is particularly adapted for carrying loads in compression and is that form of rolled shape giving the largest compressive resistance in proportion to its weight. The use of the H-beam may be said to mark an era in the history of mine timbering when it was introduced in England in 1885 by the Darlington Iron & Steel Company. Its introduction into the United States by the Carnegie Steel Company has made possible the more extended and economical use of steel for gangway supports.

The diagrams which follow show standard types of steel gangway supports, an adjustable set framed with channels and pin connections as modified after the original design of R. V. Norris, also a type of channel set in which adjustability has been eliminated, together with two types of sets with H-beam legs. Where the loads are very heavy the channel sets will be found economical. In most cases the range of H-beams rolled will be sufficient, as the largest size H-beam is equivalent in strength to seasoned 14" round long leaf yellow pine timbers or seasoned 12 x 12" long leaf yellow pine timbers.

The use of adjustable gangway supports is not recommended. The three-piece steel gangway support framed with H-beam legs and I-beam collars is the exact equivalent of the three-piece wooden set and its most economical substitute.

In the anthracite coal mining region are to be found long stretches of steel timbered gangway in the mines of the leading companies, particularly in those of the Susquehanna Coal Company and its subsidiaries, the Lehigh Valley Coal Company, etc.

In No. 8 Tunnel of the Susquehanna Coal Company there are 62 sets of steel mine timbers spaced about five feet centers. The timbers used are a modification of Style F, the lug angles on the webs of the H-beams being omitted and the lug angles on the flanges being of double width. This is a double track tunnel. The center props have been eliminated and the wide open spaces mean safety and security with a minimum fire risk.

Style F gangway supports are also used in the double track heading at the foot of the Maltby Shaft, Lehigh Valley Coal Company.

The 85 sets of Style F steel mine timbers used in the mine of the Allport Coal Company weighed about 372 pounds each, or one-third the weight of the necessary framing in wood, were lagged in place with 2" plank and concreted up to car height. The installation was conducted by the ordinary mine workmen and complete sets were erected in eight minutes each by the watch. Such a construction is fireproof, foolproof, germproof.

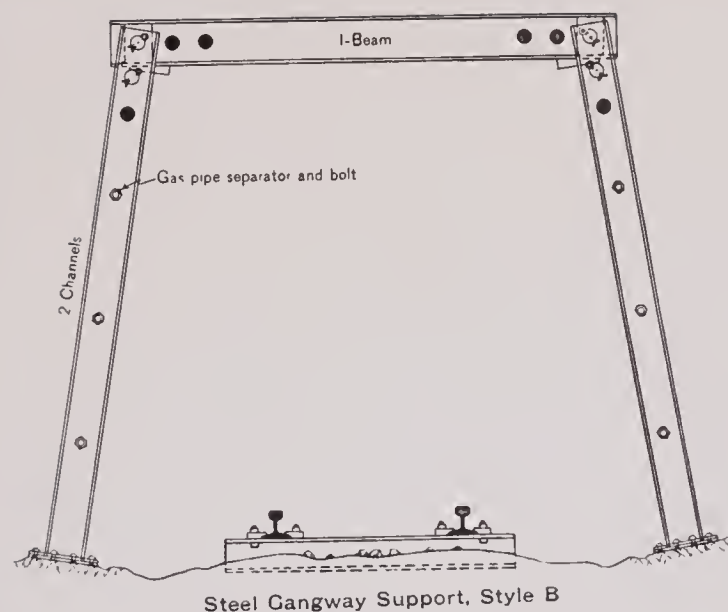
1500 feet of steel gangway in the Williamstown Colliery of the Summit Branch Mining Company is timbered with channel legs, I-beam collars and cast bases after Mr. R. V. Norris's original design. At the Stearns Shaft of the Susquehanna Coal Company the original sets put in by Mr. Norris in 1897 are still in place giving excellent service without material deterioration.

Style E gangway support is the type in favor with the Lehigh & Wilkes-Barre Coal Company. The advantage derived from the freedom of the heading from central props is particularly well seen wherever it is necessary to run in curves or to place tracks at different levels.

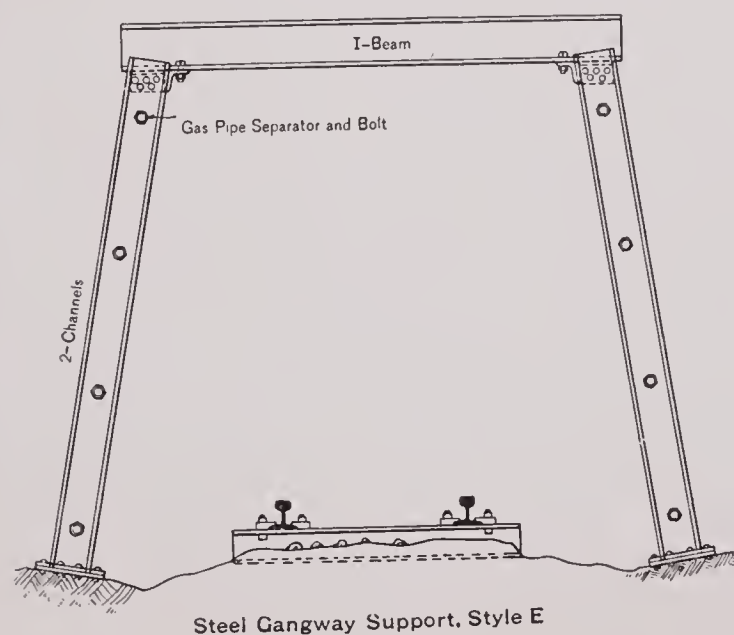
At Honeybrook Colliery No. 5 of the Lehigh & Wilkes-Barre Coal Company Style E framing with H-beam posts provides for both a pump room and a gangway. The installation is lagged with old rails and plates, the floor of the pump room is cemented and a cement gutter along the track takes care of the moisture. The relative sizes of steel and wood mine timbers can be well seen in the illustration of this installation. Certainly the open spaces, good ventilation and fireproof character of this installation will outweigh in operation and maintenance large differences in first cost.

The same relative advantages of steel as compared with wood are to be seen in the installation of Style F steel gangway supports at the colliery of the Oak Hill Coal Company, Minersville, Pa. The central prop on a double track gangway may be necessary in wooden framing. Its presence is always a detriment to free operation and a menace to lives and property. Its room is always to be preferred to its company.

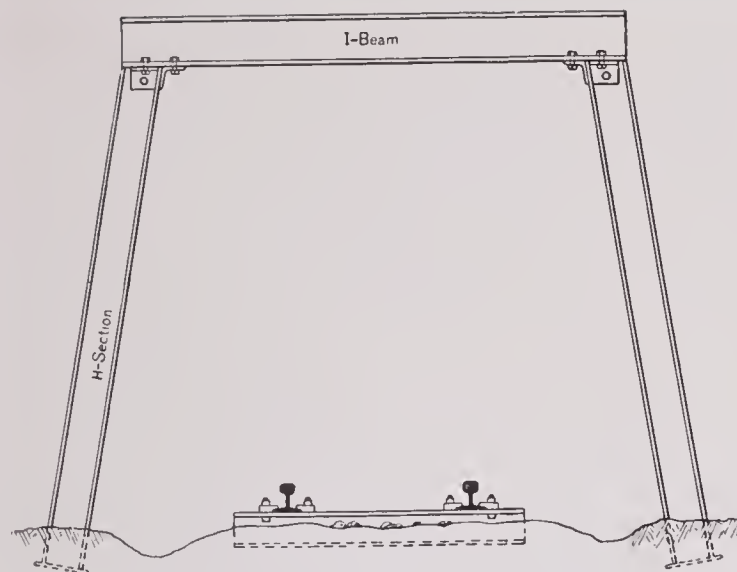
Among the excellent older installations of steel mine timbers are those of the Berwind-White Coal Mining Company in Eureka Mine No. 36. The collars are 12" beams, the legs are 8" channels and the sets are lagged in part with 30-pound rails and in part with lumber. The simplicity of the construction is shown in the fact that the plain material was bought at the rolling mill and the fabrication done in the company's own shop by its own workmen.



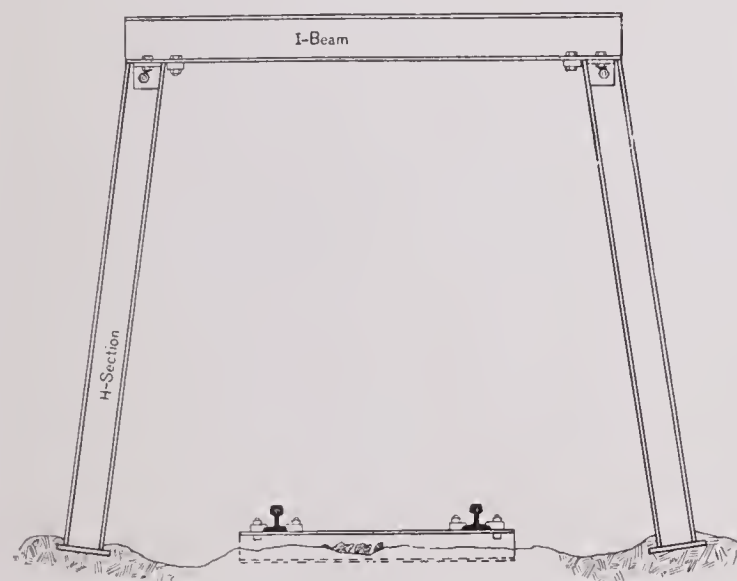
Style B. The modern form of the adjustable gangway support, comparatively high in cost where loads are light but adapted to almost any requirement of strength and recommended where adjustability is considered necessary. Made of an I-beam collar and channel legs, the two pieces each of which are separated by gas pipe separators. Pins are used at the top of the legs, one passing through the beam, cast iron distance pieces and channels, and one through the channels only. Steel wedges driven under the collar serve to distribute the load on both pins. The extra holes serve to take up differences in width or height.



Style E. An economical form of gangway support made of channel legs and I-beam collar, not adjustable but similar to installations in which steel beams are used with wooden legs. The use of the steel channel legs avoids a large waste in framing customary in wooden timbering. The two channels forming the leg are connected by bolts and separators, carry angle brackets at their tops on which the collar rests and foot on a steel plate to which bars are riveted to prevent motion at the bases. If the footing is good, the base plates may be omitted or plain plates used. Angles riveted to the channels transmit the load from the collar; bent angle lugs prevent undue side motion.



Steel Gangway Support, Style F



Steel Gangway Support, Style G

Style F. The ideal form of gangway support for simplicity and economy, combining the high cross bending strength of the I-beam collar with the high compressive strength of the H-beam leg, the exact equivalent of the three-piece wooden set. The lug angles at the top prevent side motion and absolutely plain plates are used for bearings. If the footing is good, and the plates are omitted, there are but three pieces to handle. Erected much more quickly and easily than wooden sets, with the least possible material and weight for a given load. Prime favorites with all who have used them.

Style G. A form of gangway support identical with Style F except that bars are used to prevent side motion instead of angles; in much favor with some users.

The angle lugs or bars shown with styles F and G are sufficient for ordinary conditions of loading. Where heavy deep beam collars are required in connection with heavy H-beam legs, or where strata are steeply inclined, angles or bars may be required with more than one set of bolts. In such cases 6" x 6" angles or 6" bars may be utilized instead of the 3" x 2½" angles or 3" bars usually furnished.

STEEL
MINE
TIMBERS
—
GANGWAY
SUPPORTS



STYLE F GANGWAY SUPPORTS, No. 8 TUNNEL, SUSQUEHANNA COAL COMPANY, NANTICOKE, PA.

STEEL
MINE
TIMBERS
—
GANGWAY
SUPPORTS



STYLE F GANGWAY SUPPORTS, FOOT OF MALTBY SHAFT, LEHIGH VALLEY COAL COMPANY, WILKESBARRE, PA.

STEEL
MINE
TIMBERS
—
GANGWAY
SUPPORTS



A MODERN MINE—INSIDE—STYLE F GANGWAY SUPPORTS, ALLPORT COAL COMPANY, BARNESBORO, PA.

STEEL
MINE
TIMBERS
—
GANGWAY
SUPPORTS



STEEL TIMBERED GANGWAY 1500 FEET LONG, STYLE A SETS, SUMMIT BRANCH MINING COMPANY, WILLIAMSTOWN, PA.

STEEL
MINE
TIMBERS
—
GANGWAY
SUPPORTS



STYLE E GANGWAY SUPPORTS, ON THE CURVE, MAXWELL COLLIERY No. 20, LEHIGH & WILKESBARRE COAL COMPANY

STEEL
MINE
TIMBERS
—
GANGWAY
SUPPORTS



STYLE E GANGWAY SUPPORTS, STATION 100, MAXWELL COLLIERY No. 20, LEHIGH & WILKESBARRE COAL COMPANY

STEEL
MINE
TIMBERS
—
GANGWAY
SUPPORTS



STEEL FRAMED, STEEL LAGGED, GANGWAY AND PUMP HOSE, HONEYBROOK COLLIERY No. 6, LEHIGH & WILKESBARRE COAL COMPANY

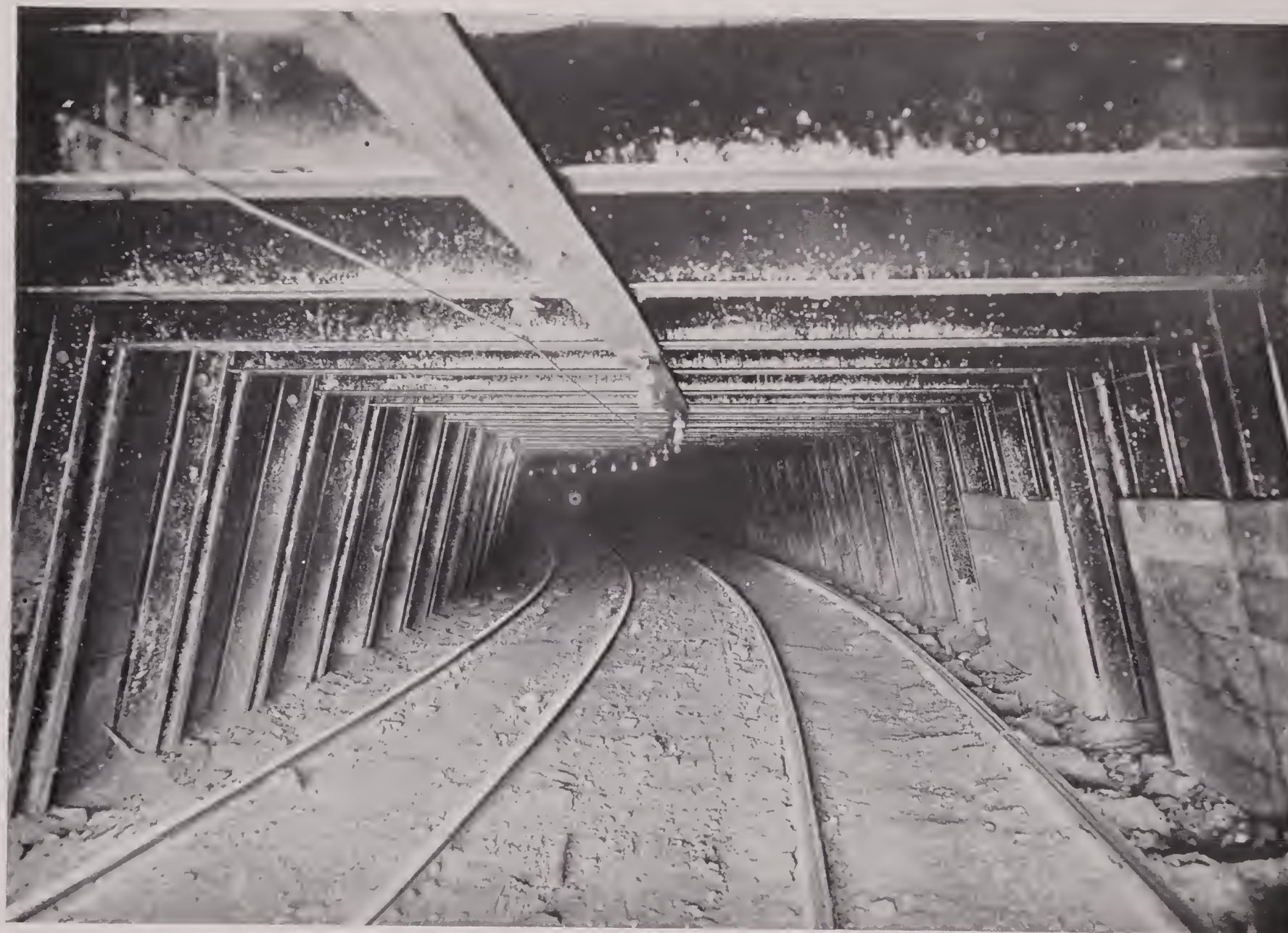
STEEL
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TIMBERS
—
GANGWAY
SUPPORTS



STYLE F GANGWAY SUPPORTS, OAK HILL COAL COMPANY, MINERSVILLE, PA.

STEEL
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TIMBERS

GANGWAY
SUPPORTS



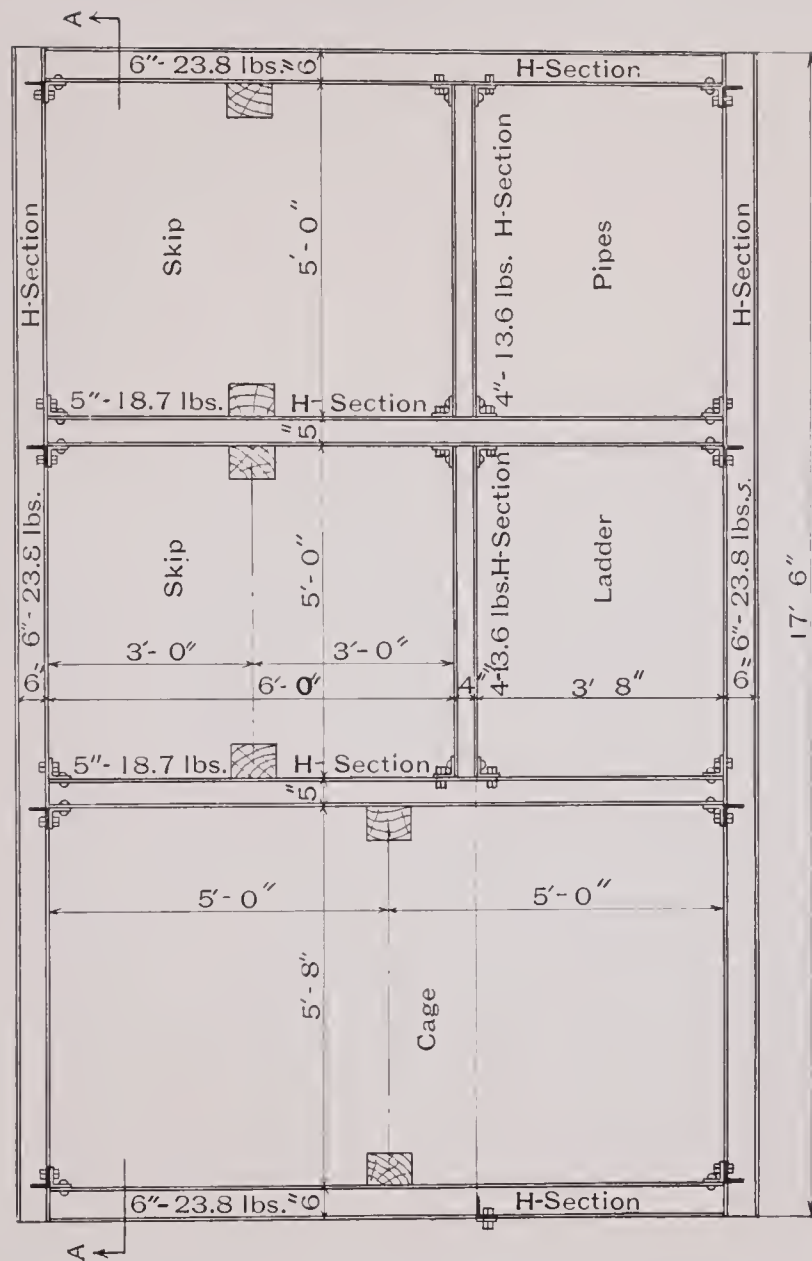
STYLE A GANGWAY SUPPORTS, EUREKA MINE No. 36, BERWIND-WHITE COAL MINING COMPANY, WINDBER, PA.

Every consideration which may be adduced for the building of fireproof structures above ground avails with greater force for the elimination of inflammable materials, so far as possible, from underground structures. The fire risk is always with us and examples might be enumerated to emphasize the importance of the use at recognized points of danger of those materials of construction which are fitted to reduce, if not entirely to avoid, the economic wastes due to the use of wooden timbers in locations for which they are not in every respect adapted. Safety from fire losses does not necessarily mean eternal vigilance, though vigilance needs always to be exercised in the small things of mine maintenance and operation as well as in the large ones. The fire which took place on August 26th, 1908, in the mine of the Hailey-Ola Coal Company, at Haileyville, Okla., by which 29 miners out of 132 lost their lives, was due to the substitution of crude petroleum for lubricating oil furnished the miners for the lubrication of cars. The notably disastrous fire which started on November 13th, 1909, in the mine of the Chicago, Milwaukee & St. Paul Railway, at Cherry, Ill., was due to the ignition of hay being trammed into the mines for feeding the mules.

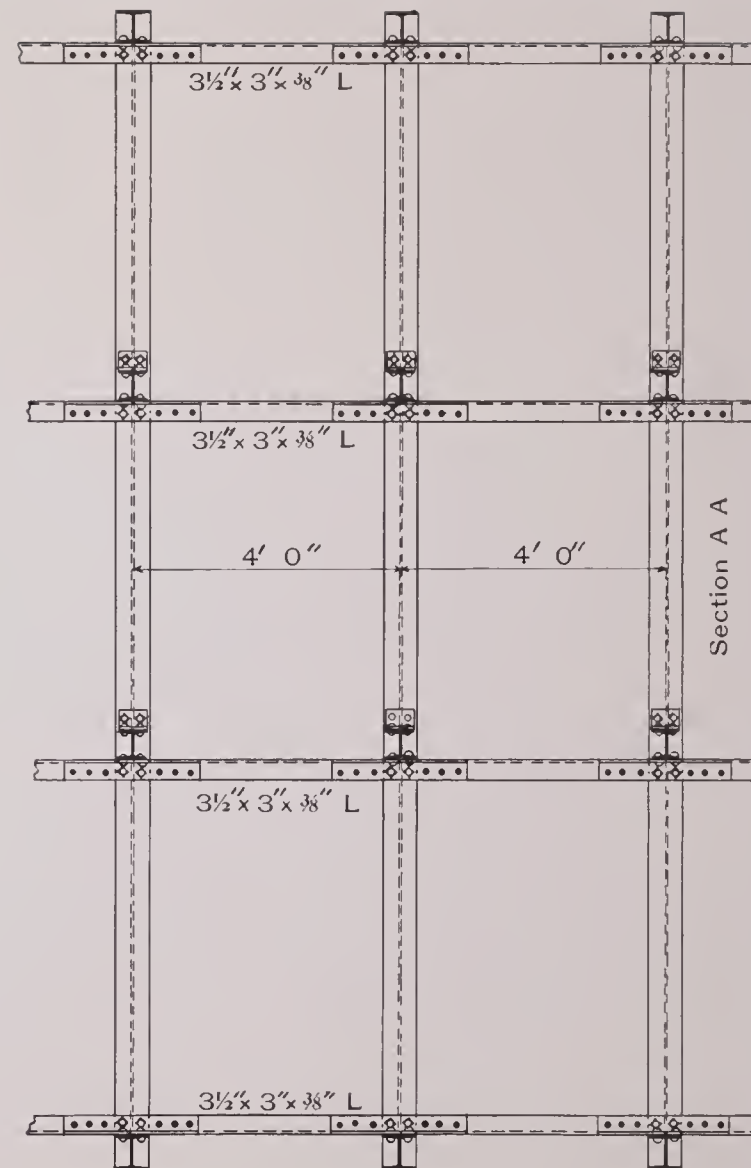
In the mine of the Maryd Coal Company, at Maryd, Pa., little or no difficulty is experienced from squeezes, though an occasional smooth is encountered. 25 sets of Style F mine timbers, however, are used in this mine for the purpose of fire protection in the underground stable shown in the illustration. The high roof and the large space provided certainly conduce to cleanliness and good ventilation and, therefore, much more sanitary conditions for the motive power of the mine than the ordinary wooden framing.

While the Stearns Shaft of the Susquehanna Coal Company is the first recorded instance in the United States of a scientifically designed steel framed heading, the earliest example of the steel framed pump house is probably that of the Lehigh Valley Coal Company at Hazleton, Pa., built in 1897, where 12" 35 lb. I-beams were used for framing resting on and joined by special castings and lagged with steel rails backed with concrete.

The simplification in detail which has attended the increased use of steel in mine timbering is seen in the illustration of the pump house at No. 5 Mine, Pennsylvania Coal & Coke Company,



TYPICAL STEEL FRAMING FOR FIVE COMPARTMENT MINE SHAFT

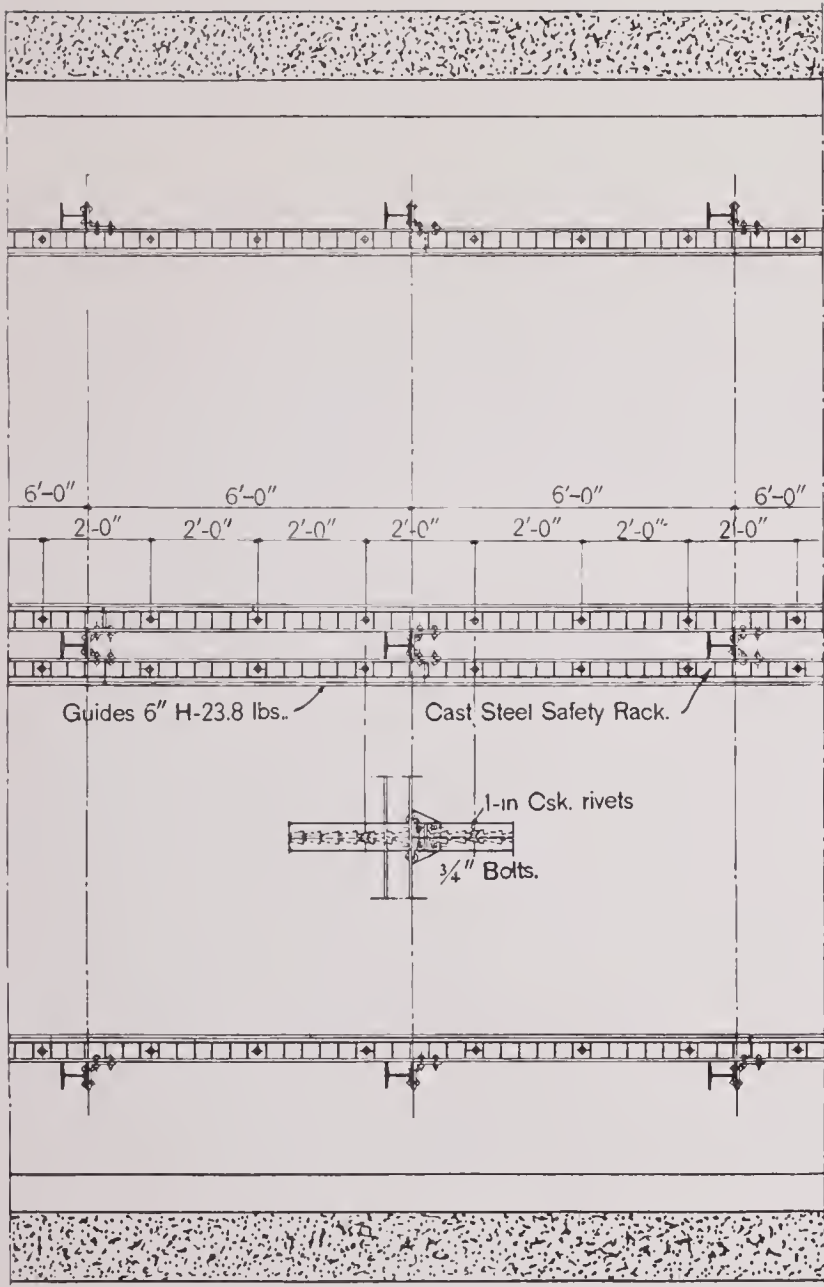


STEEL
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MINE
SHAFTS

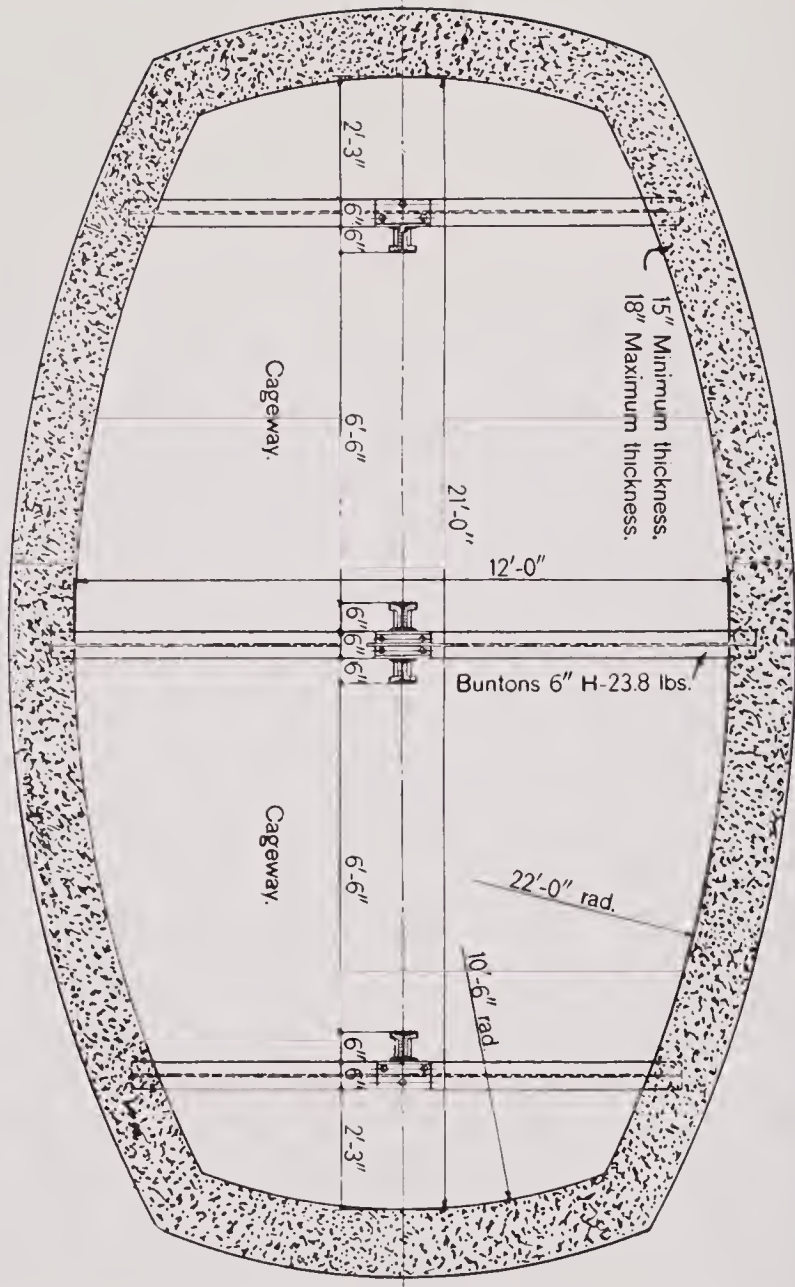
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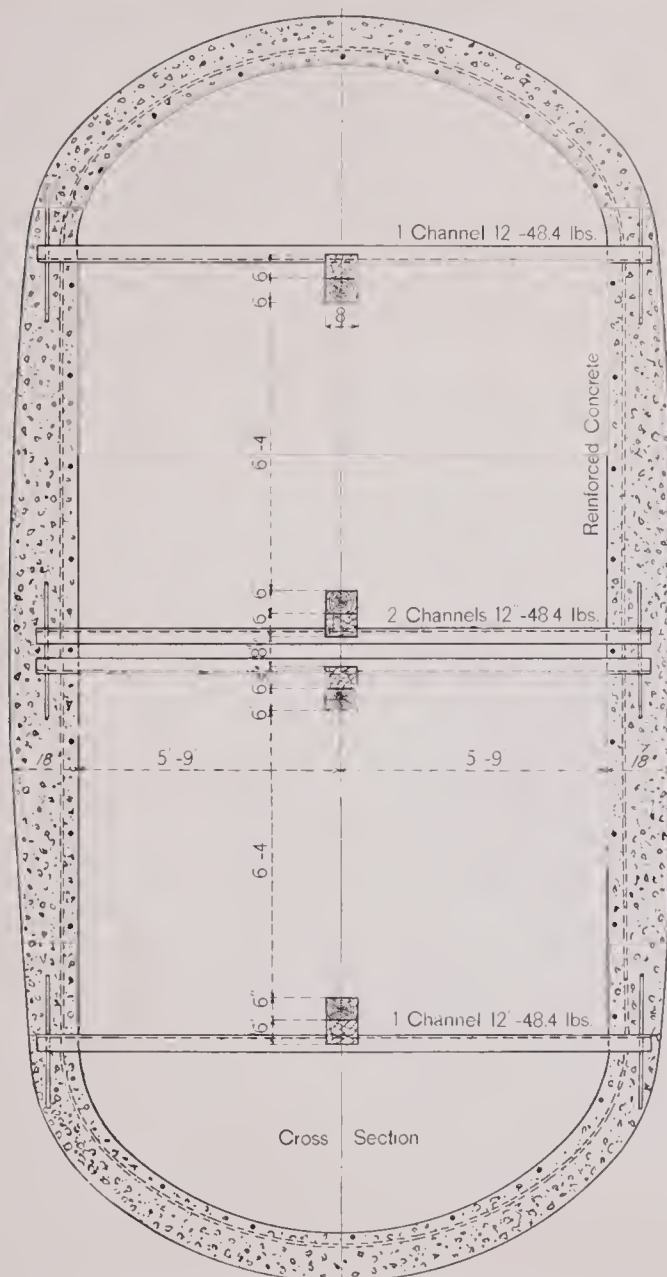
MINE
SHAFTS



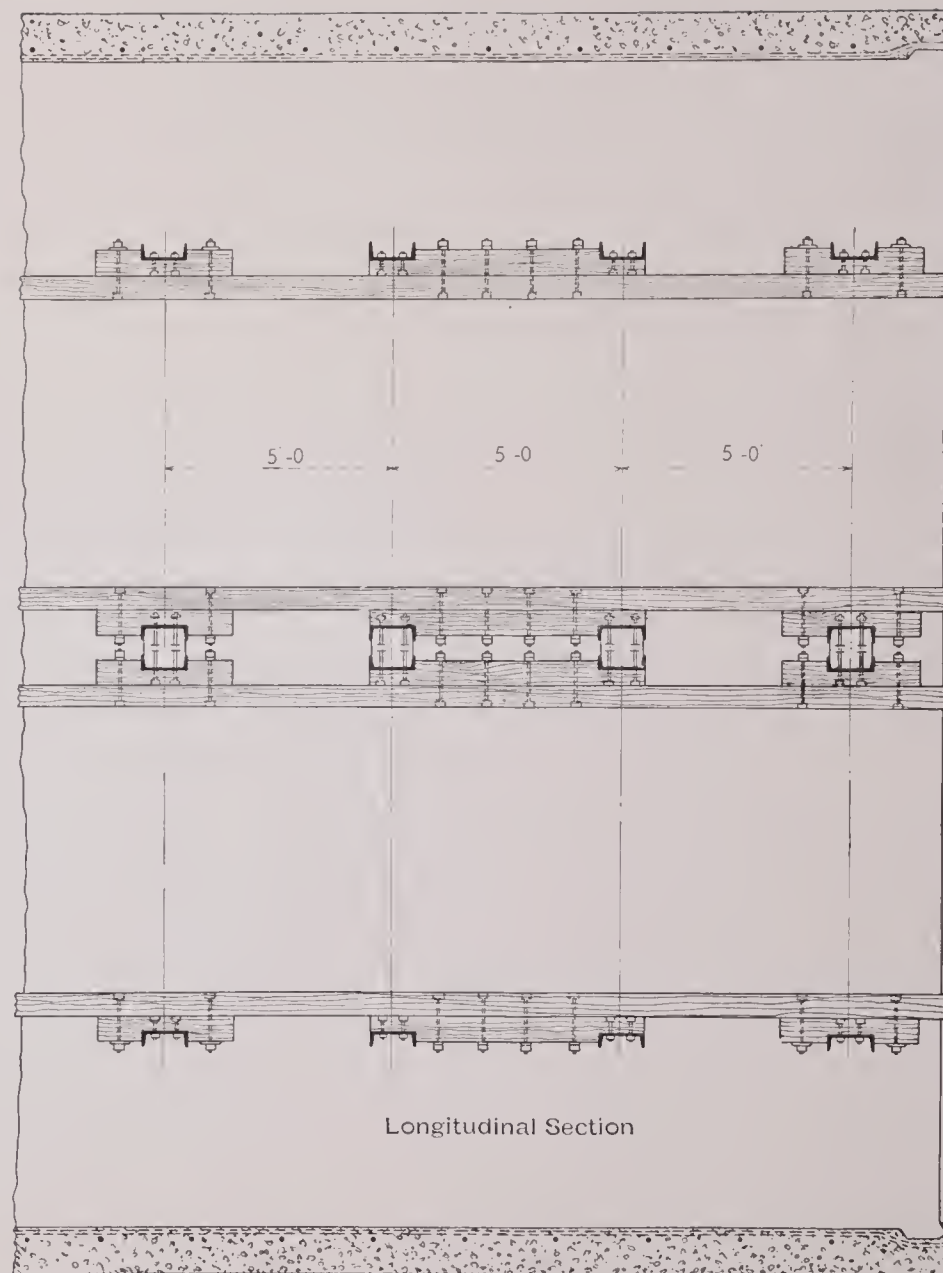
Elliptical Hoisting Shaft
Tennessee Coal Iron and Railroad Company,
Mine No. 13 Ensley, Ala.



HOISTING SHAFT WITH H-BEAM GUIDES AND BUNTIONS, TENNESSEE COAL, IRON & RAILROAD COMPANY, ENSLEY, ALA.



Hoisting Shaft
Four State Coal Company
Annabelle Mine—Worthington, W. Va.



STEEL
MINE
TIMBERS
—
MINE
SHAFTS

STEEL CHANNEL BUNTONS IN HOISTING SHAFT, FOUR STATE COAL COMPANY, ANNABELLE MINE, WORTHINGTON, W. VA.

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MINE
TIMBERS



STEEL MINE TIMBERS IN STOCK. NOT HOW BIG A PILE BUT HOW MANY. STRONGER THAN WOOD, WITH LESS BULK AND LESS WEIGHT

One copy del. to Cat. Div.

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